PULSE CROP ECONOMICS

COMPARISON TO OTHER CROPS

& ROTATION ECONOMICS

March 11, 2011

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Why is the developing pulse crop industry important to the Montana Department of Agriculture?

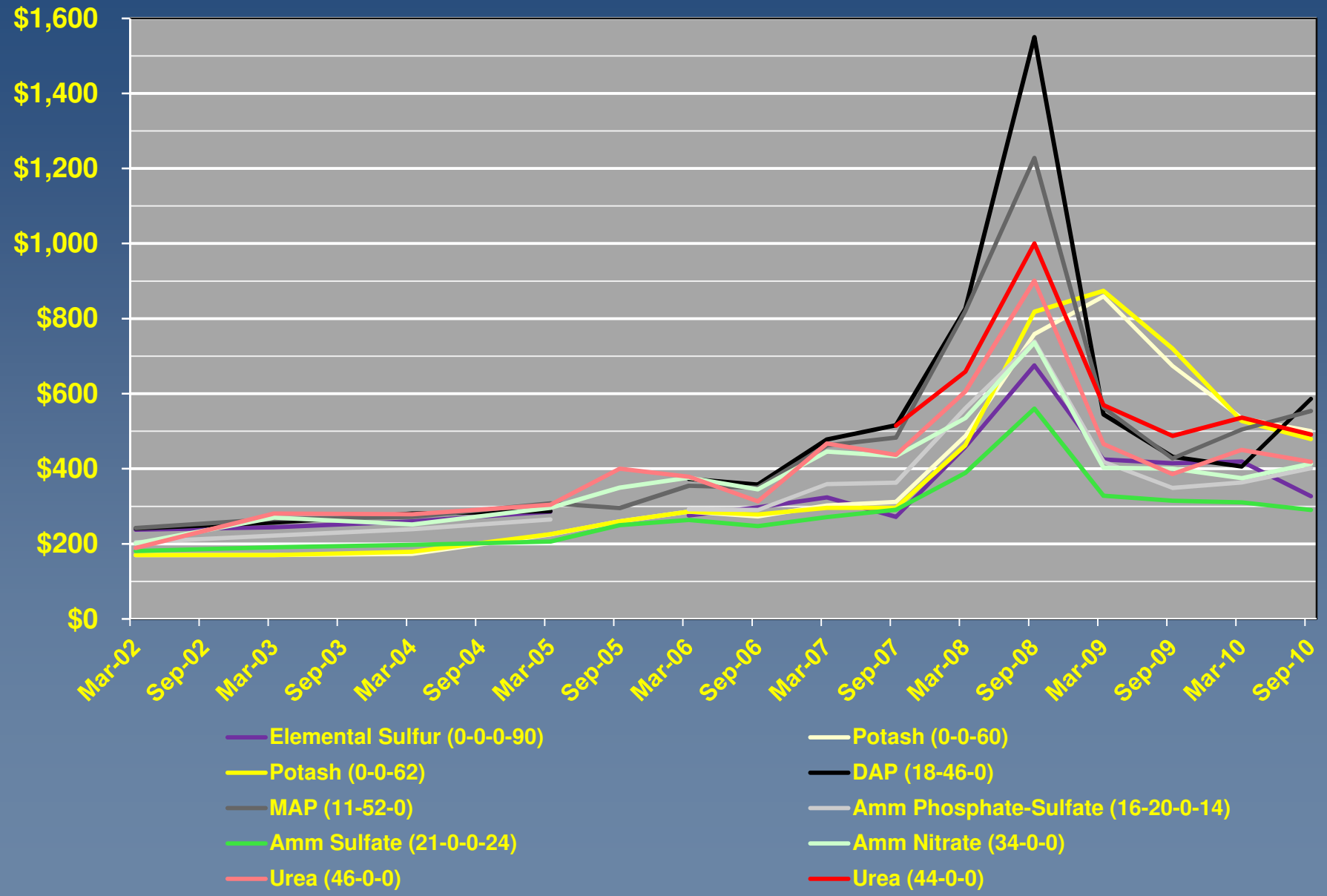
Why is this important to you?

Pulse crops appear to be a good opportunity for Montana's farmers:

- Competitive Economics
- Rotational Benefits
  - Boost in yield & quality of following cereal crops
  - Help break disease cycles
  - Help deal with insect problems (sawfly)
  - Change carbon-nitrogen ratio (improve soil health)
  - Weed Control
- Reduced fertilizer inputs
- Possibility of more intensive rotations
- Diversification: of production & marketing risks, buyers, markets
- Flexibility: grain, forage, cover crop

The role of fertilizer in the year-to-year comparisons:

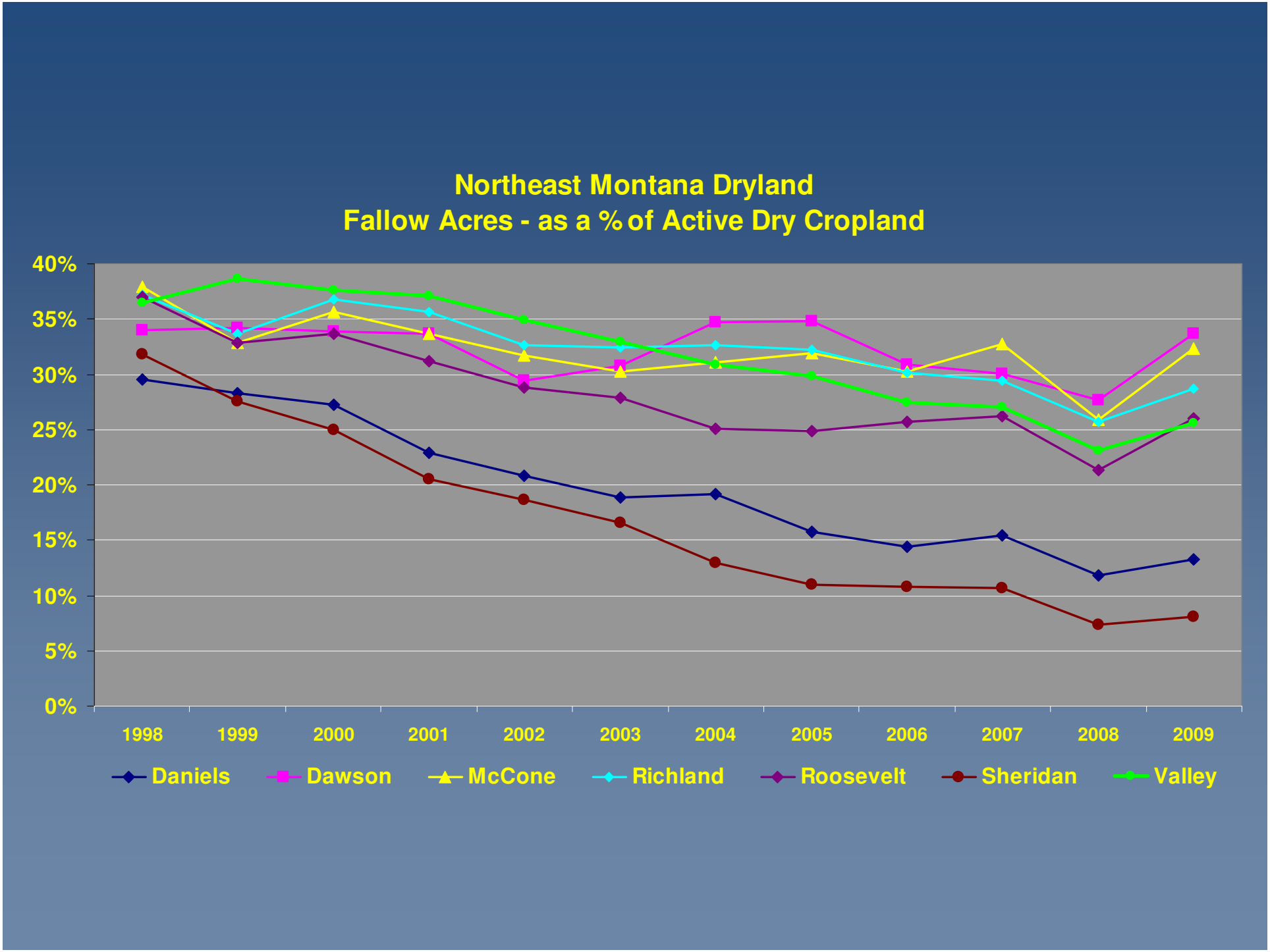
State Average Fertilizer Price 2002 - 2010 ($/ton)

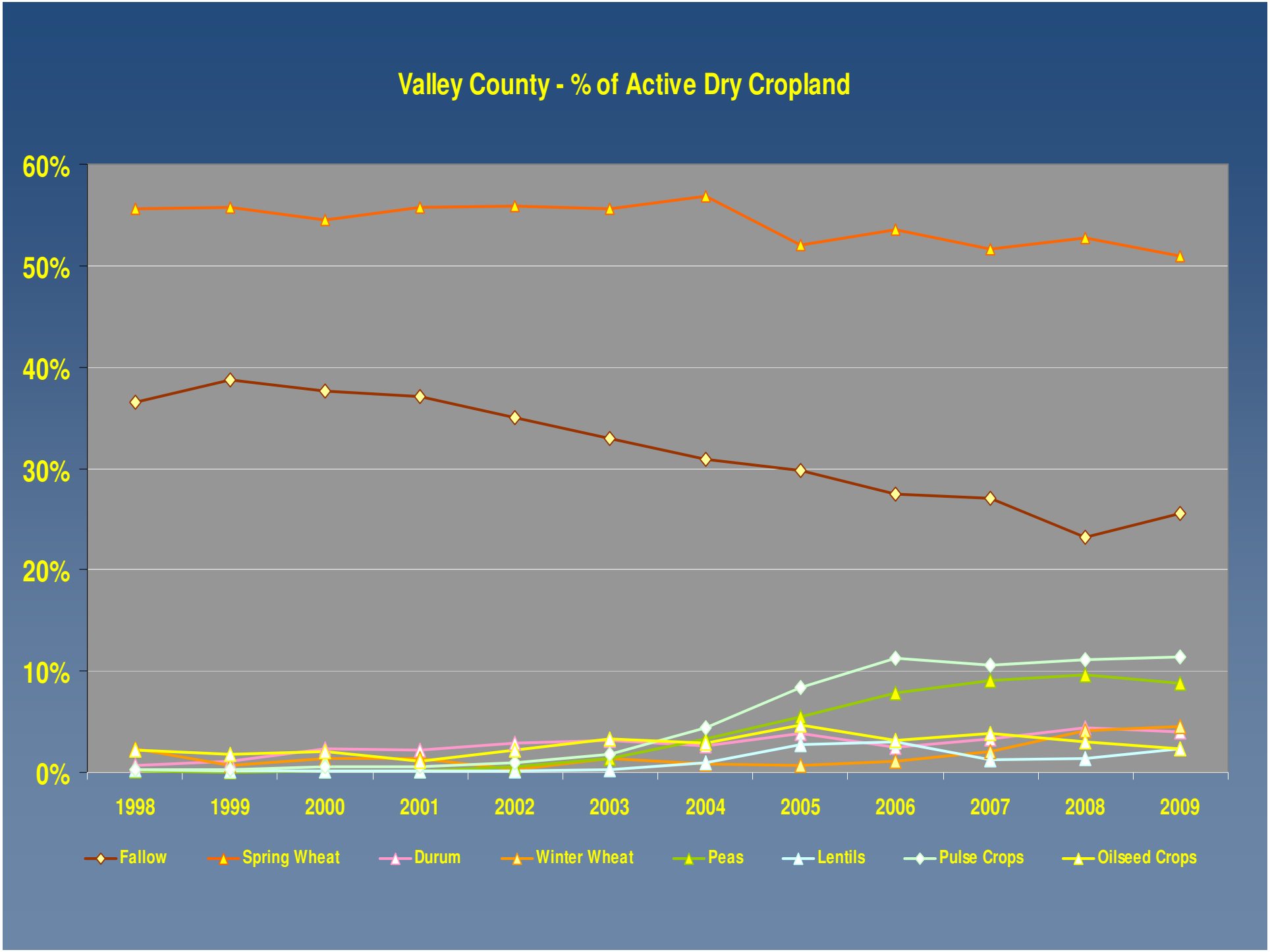


ACREAGE TRENDS IN NORTHEAST MONTANA

1998 - 2009

Pulse Crop Impact on Fallow & Wheat Acres


Northeast Montana Dryland
Fallow Acres - as a % of Active Dry Cropland
40%
35%
30%
25%
20%
15%
10%
5%
0%
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Daniels
Dawson
McCone
Richland
Roosevelt
Sheridan
Valley


Valley County - % of Active Dry Cropland
60%
50%
40%
30%
20%
10%
0%
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Fallow
Spring Wheat
Durum
Winter Wheat
Peas
Lentils
Pulse Crops
Oilseed Crops

Valley County Dry Cropland
Change Since 1998 (acres)

Why is the developing pulse crop industry important to the Montana Department of Agriculture?

Opportunity for increased agricultural processing in Montana

- More Jobs
- More economic activity in our communities
  - Opportunity for spin-off businesses
  - Helps keep existing businesses open
  - Helps fight trend of declining rural populations
  - Diversification makes local economics more stable
- Better & more dependable prices: processing creates strong markets
- Allows us to ship products that are worth more
- Byproduct benefits local livestock feeding and dairy industries

PULSE CROP ECONOMICS

Approach: Comparison of Returns After Direct Costs

Why compare returns after direct costs?

- Majority of indirect costs are fixed costs *(within relevant ranges of scale)* & are sunk regardless of the crop produced.
  - Equipment
  - Labor
  - Land ownership / cash rent *(direct, but not dependent upon crop)*

- In general - very little difference in fixed / indirect costs between crops

PULSE CROP ECONOMICS

Approach: Comparison of Returns After Direct Costs

Revenue – Value of Crop + Crop Insurance Revenue

- **Government payments assumed not to change with crop selection**

Direct Costs:

- **Seed**
- **Herbicides**
- **Fungicides**
- **Insecticides**
- **Fertilizer – replacement of NPK & S for yield harvested**
- **Crop Insurance**
- **Fuel & Lubrication for Field Operations**
- **Trucking from Farm to Delivery Point**
- **Operating Interest**
- **N Credit for Peas & Lentils – value of 10 lbs N / acre**

PULSE CROP ECONOMICS

DRYLAND PRODUCTION

REGIONAL DRYLAND AVERAGE YIELDS: (2004 - 2008)

	Low	Ave	High
WW (bu/acre)	39.2	43.8	47.2
SW (bu/acre)	19.3	27.4	35.0
SW-Recrop (bu/acre)	15.0	22.0	26.0
Barley (bu/acre)	33.0	46.4	57.0
Barley-Recrop (bu/acre)	23.0	35.8	45.0
Durum (bu/acre)	27.0	32.9	38.0
Durum-Recrop (bu/acre)	12.0	22.7	30.0
Pea (bu/acre)	16.5	27.0	42.7
Lentil (lb/acre)	690	1,018	1,480
Chickpea* (lb/acre)	450	682	890

2011 PRICE ESTIMATES

Spring Wheat (14%)	$8.50 / bu ? Current Price: $10.60
Durum	$8.25 / bu ? Current Price: $8.95
Winter Wheat (Ord)	$6.50 / bu ? Current Price: $6.72
Malt Barley	$4.52 - $6.00 / bu $9.41 – $12.50 / cwt Current Price: $5.28/bu $11.00/cwt
Feed Barley	$4.25 / bu $8.85 / cwt ? Current Price: $4.92/bu $10.25/cwt

2011 PRICE ESTIMATES

Peas	**$6.75 - $8.25 / bu $11.25 - $13.75 / cwt**
Green ***Cruiser-type*** **(No. 1)**	**Current Price: $8.00/bu $13.33/cwt**
Med. Yellow (No. 1)	**Current Price: $6.75 - $7.95 /bu $11.25 - $13.25/cwt**
Feed	**Current Price (Sask): $4.83/bu $8.05/cwt**

2011 PRICE ESTIMATES

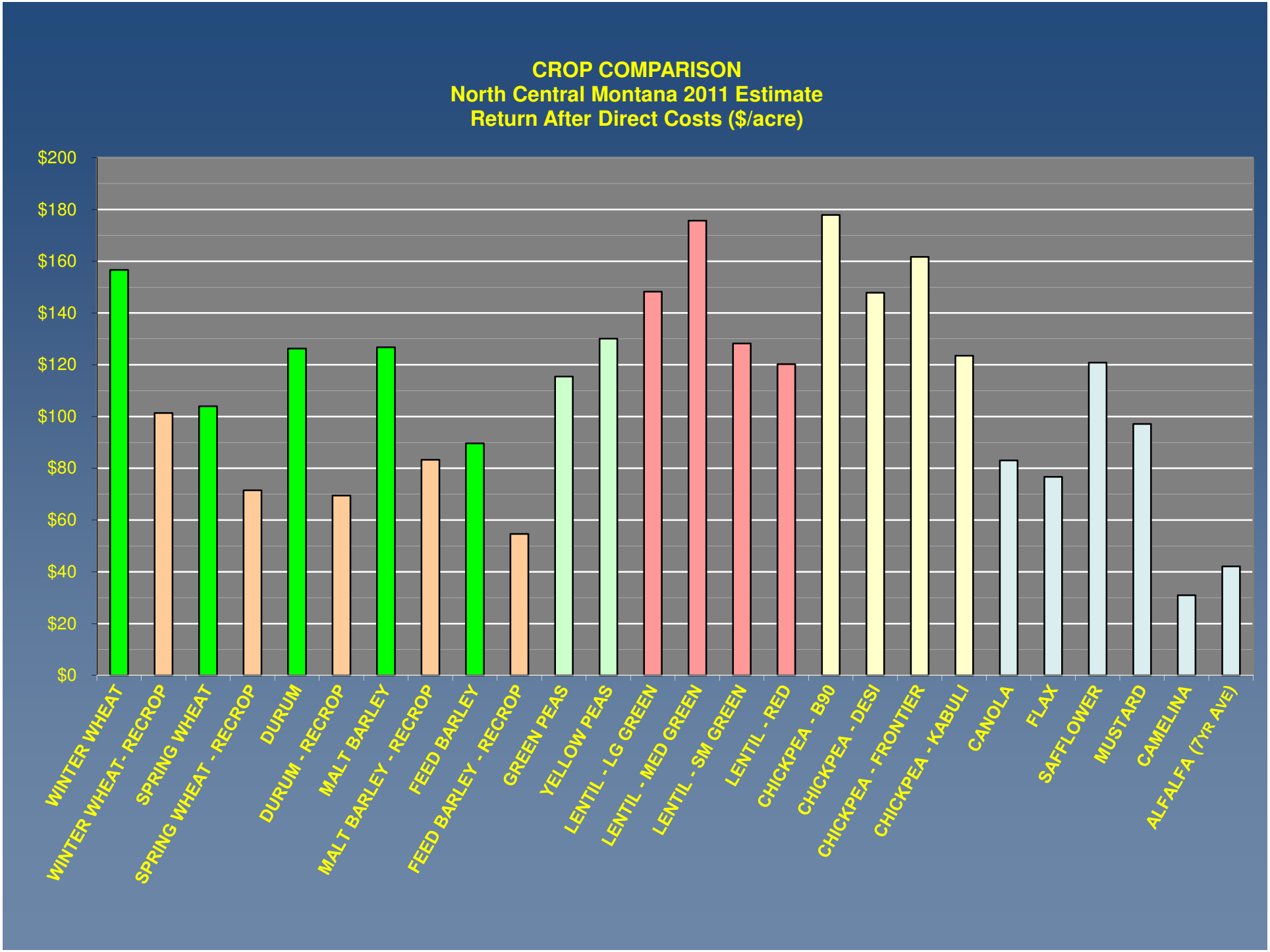
Lentil	$21.00 - $25.75/cwt (Chad) – used in charts $23.00 / cwt (NDSU)
Laird (Large Green) No. 1	Current Price: $39.53/cwt Canadian Sept/Oct/Nov Offers: $25 - $27.75/cwt
Richlea (Medium Green) No. 1	Current Price: $34.55/cwt Canadian Sept/Oct/Nov Offers: $23.20 - $25.75/cwt
Eston (Small Green) No. 1	Current Price: $31.29/cwt Canadian Sept/Oct/Nov Offers: $23.20 - $25.75/cwt
Red No. 1	Current Price: $21.81/cwt Canadian Sept/Oct/Nov Offers: $19.80 - $22/cwt

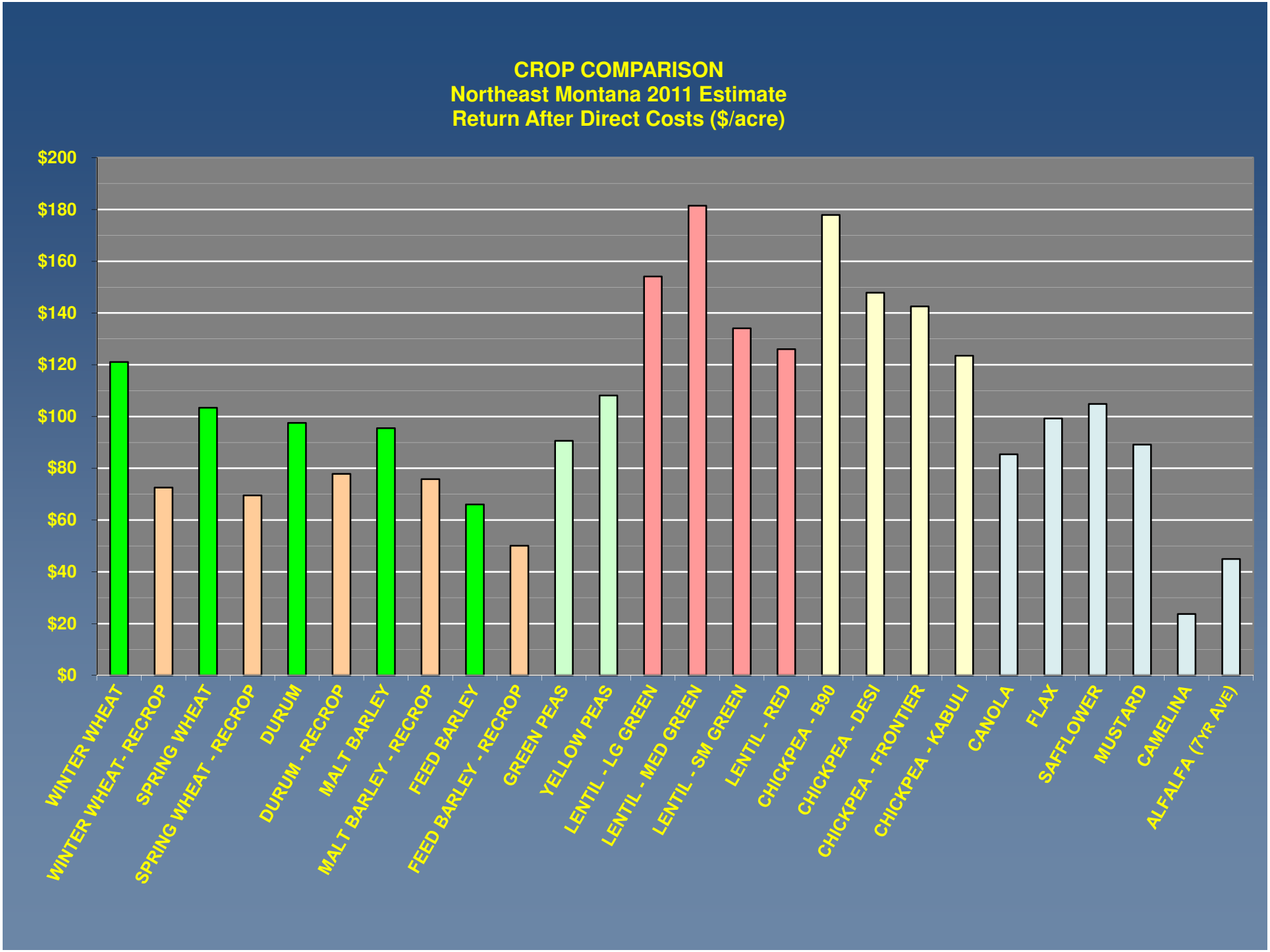
2011 PRICE ESTIMATES

Chickpea	**$24.50 - $32/cwt (Chad)** **$24.50 / cwt (NDSU) – used in charts**
Kabuli 9mm (No. 1)	**Current Price: $36.44/cwt** **Canadian S/O/N Offers: $31.10 – $34.50/cwt**
Frontier 7mm (No. 1)	**Current Price: $29.36/cwt** **Canadian S/O/N Offers: $24.50 – $25.50/cwt**
B-90 (No. 1)	**Current Price: $26.91/cwt *(Canada)*** ***Controlled by United Pulse in US: probably similar to higher than current price listed***
Desi	**Current Price: $25.17/cwt** **Canadian S/O/N Offers Desi: $22.30 - $24.75/cwt**

2011 PRICE ESTIMATES

Mustard	$30/cwt +/- ? Current Price: $29.27
Canola	$23/cwt (Chad) $25.00 / cwt (Nov 11 ICE Futures on 3/10/11) Current Price: $25.46/cwt
Flax	$12/bu / $21.43/cwt ? Current Price: $13.26/bu / $23.68/cwt
Safflower	$26 - $28 / cwt Current Price: ???
Camelina	$15.00 / cwt


CROP COMPARISON
North Central Montana 2011 Estimate
Return After Direct Costs ($/acre)
$200
$180
$160
$140
$120
$100
$80
$60
$40
$20
$0
WINTER WHEAT
WINTER WHEAT - RECROP
SPRING WHEAT
SPRING WHEAT - RECROP
DURUM
DURUM - RECROP
MALT BARLEY
MALT BARLEY - RECROP
FEED BARLEY
FEED BARLEY - RECROP
GREEN PEAS
YELLOW PEAS
LENTIL - LG GREEN
LENTIL - MED GREEN
LENTIL - SM GREEN
LENTIL - RED
CHICKPEA - B90
CHICKPEA - DESI
CHICKPEA - FRONTIER
CHICKPEA - KABULI
CANOLA
FLAX
SAFFLOWER
MUSTARD
CAMELINA
ALFALFA (7YR AVE)


CROP COMPARISON
Northeast Montana 2011 Estimate
Return After Direct Costs ($/acre)
$200
$180
$160
$140
$120
$100
$80
$60
$40
$20
$0
WINTER WHEAT
WINTER WHEAT - RECROP
SPRING WHEAT
SPRING WHEAT - RECROP
DURUM
DURUM - RECROP
MALT BARLEY
MALT BARLEY - RECROP
FEED BARLEY
FEED BARLEY - RECROP
GREEN PEAS
YELLOW PEAS
LENTIL - LG GREEN
LENTIL - MED GREEN
LENTIL - SM GREEN
LENTIL - RED
CHICKPEA - B90
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CHICKPEA - FRONTIER
CHICKPEA - KABULI
CANOLA
FLAX
SAFFLOWER
MUSTARD
CAMELINA
ALFALFA (7YR AVE)

PULSE CROP ECONOMICS

IRRIGATED PRODUCTION

PULSE CROP ECONOMICS

CROP COMPARISONS

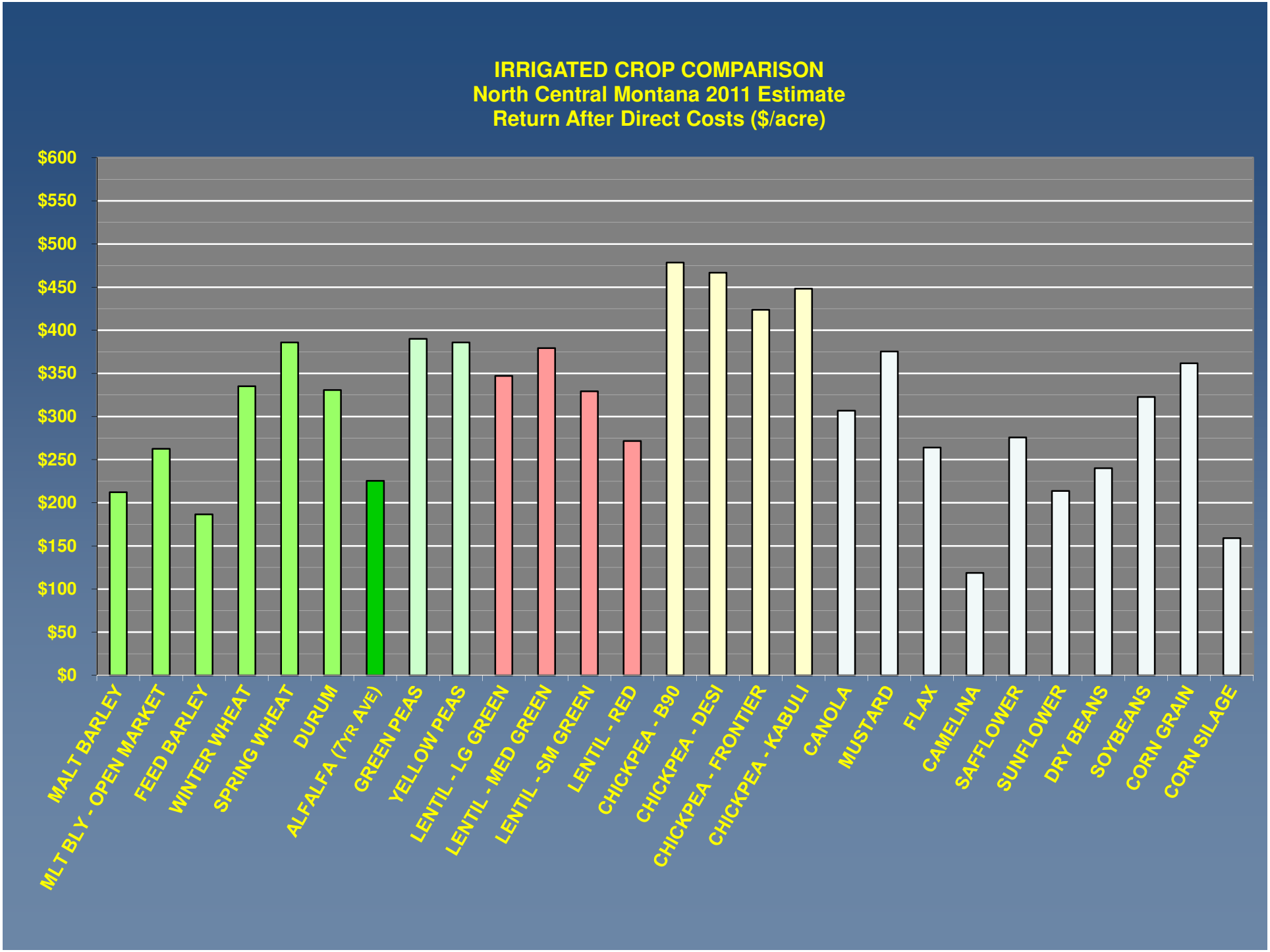
What about pulse crops under irrigation?

- Successful irrigated pea production has been achieved in the Valier and Fairfield areas – but production has been somewhat limited
- Irrigated lentils are currently uncommon - but potential returns appear high
  - Low water use
  - Careful water management required
- Chickpeas – disease is a concern
  - But buyers are interested because of stability provided by irrigation and low humidity of the region
  - Potentially a very valuable crop
- Dry Beans in the Golden Triangle in the future???

How do irrigated pulses compare to other crops?

POSSIBLE AVERAGE YIELD RANGE FOR NORTH CENTRAL MONTANA:

	Low	Ave	High
WW (bu/acre)	80	95	115
SW (bu/acre)	75	85	100
Barley (bu/acre)	80	95	110
Durum (bu/acre)	70	80	95
Pea (bu/acre)	55	70	80
Lentil (lb/acre) ????	1,500	2,250	2,750
Chickpea (lb/acre) ????	1,500	2,500	3,000
Canola (lb/acre)	2,250	2,750	3,200
Mustard (lb/acre)	1,500	1,800	2,250
Flax (bu/acre)	35	40	50
Alfalfa (7-Yr Ave, ton/acre)	4.25	4.80	5.25


IRRIGATED CROP COMPARISON
North Central Montana 2011 Estimate
Return After Direct Costs ($/acre)
$600
$550
$500
$450
$400
$350
$300
$250
$200
$150
$100
$50
$0
MALT BARLEY
MLT BLY - OPEN MARKET
FEED BARLEY
WINTER WHEAT
SPRING WHEAT
DURUM
ALFALFA (7YR AVE)
GREEN PEAS
YELLOW PEAS
LENTIL - LG GREEN
LENTIL - MED GREEN
LENTIL - SM GREEN
LENTIL - RED
CHICKPEA - B90
CHICKPEA - DESI
CHICKPEA - FRONTIER
CHICKPEA - KABULI
CANOLA
MUSTARD
FLAX
CAMELINA
SAFFLOWER
SUNFLOWER
DRY BEANS
SOYBEANS
CORN GRAIN
CORN SILAGE

PULSE CROP ECONOMICS

ROTATION COMPARISONS

Approach: Comparison of Average Annual Returns After Direct Costs

Why compare rotations instead of individual crops?

- Average annual returns are needed for comparability

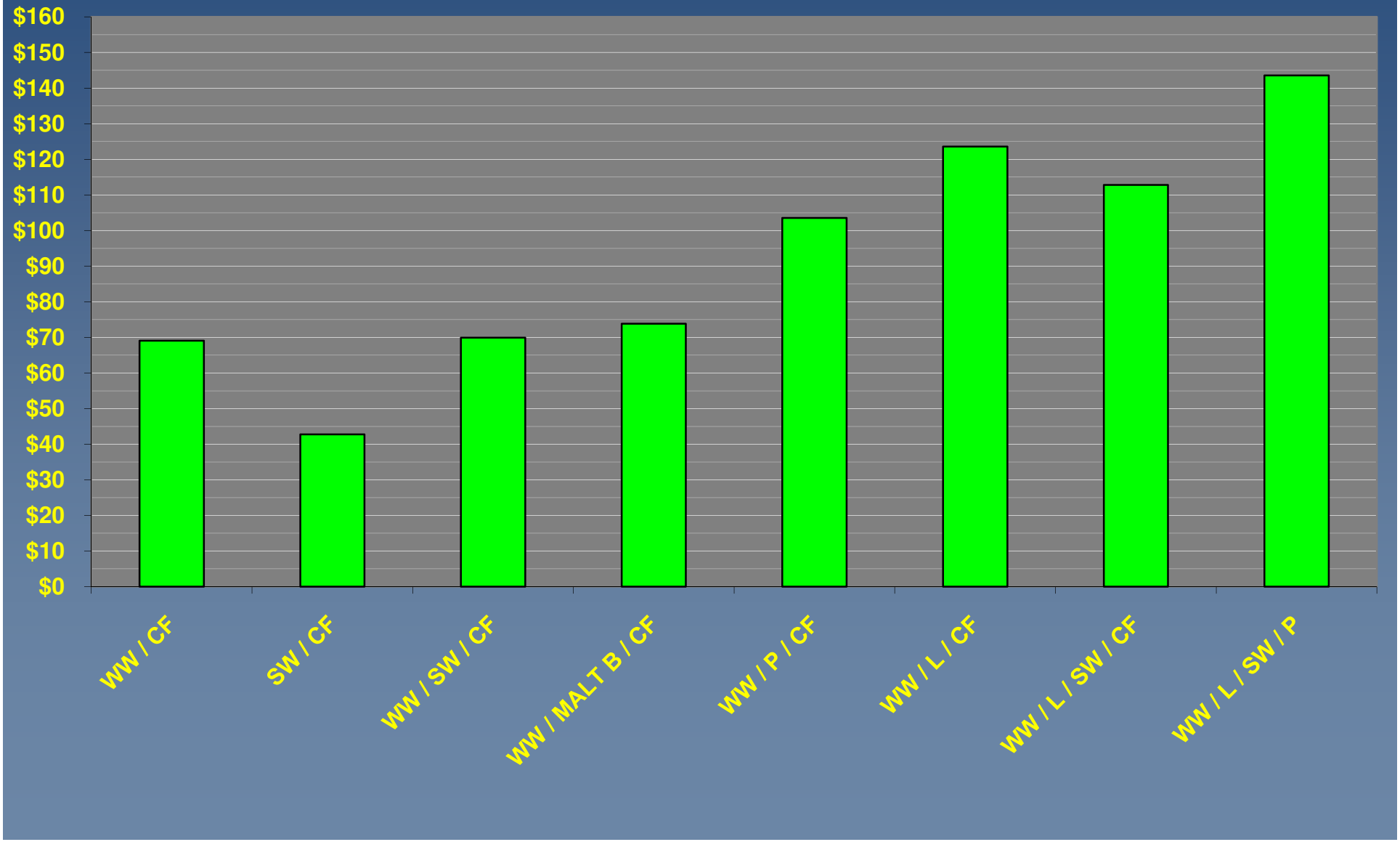
- Rotations may vary for a variety of reasons and objectives
  - Cropping Intensity
  - Moisture & Weather Conditions
  - Integrated Pest / Disease Management / Soil Building Objectives
  - Income Diversification & Risk Management Decisions
  - Government Program Requirements (CSP)
  - Carbon Credit Trading Requirements

- Comparing rotations acknowledges that there are constraints to sequences of crops

Rotation Comparison

Average Annual Return After Direct Costs

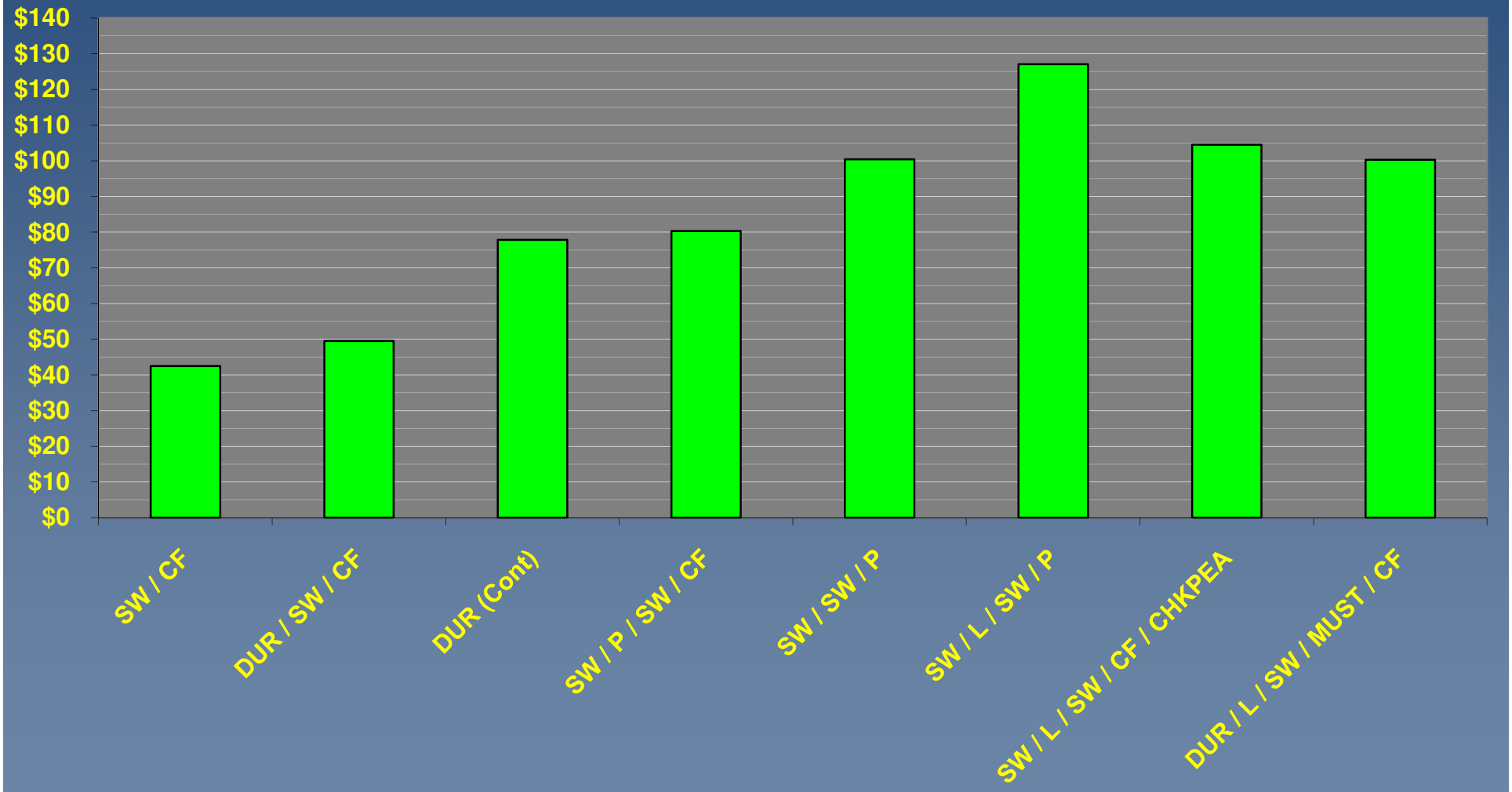
North Central Montana Dryland - 2011 Estimate



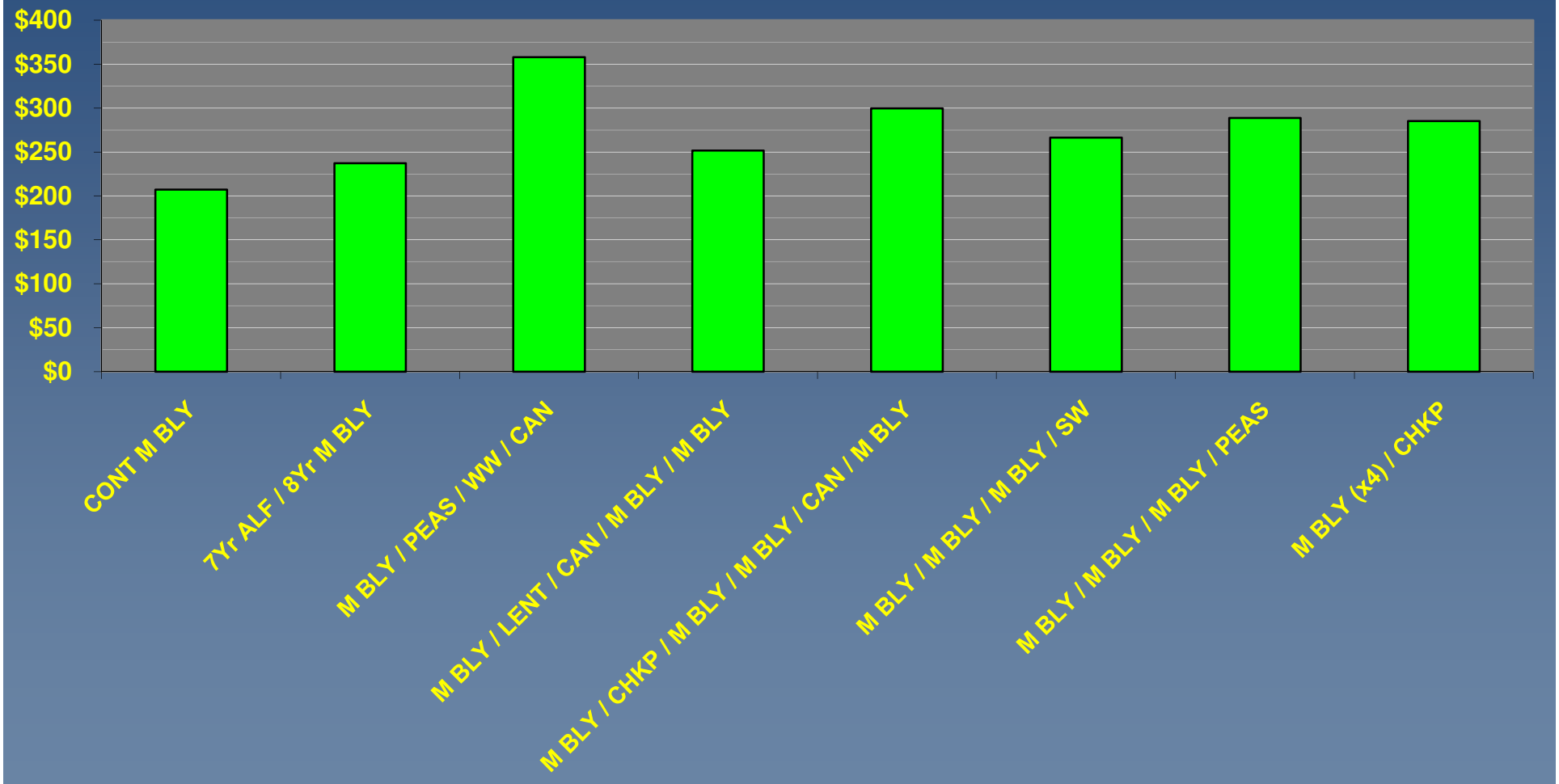
Rotation Comparison

Average Annual Return After Direct Costs

Northeast Montana Dryland - 2011 Estimate



Rotation Comparison
Average Annual Return After Direct Costs
North Central Montana Irrigated - 2011 Estimate

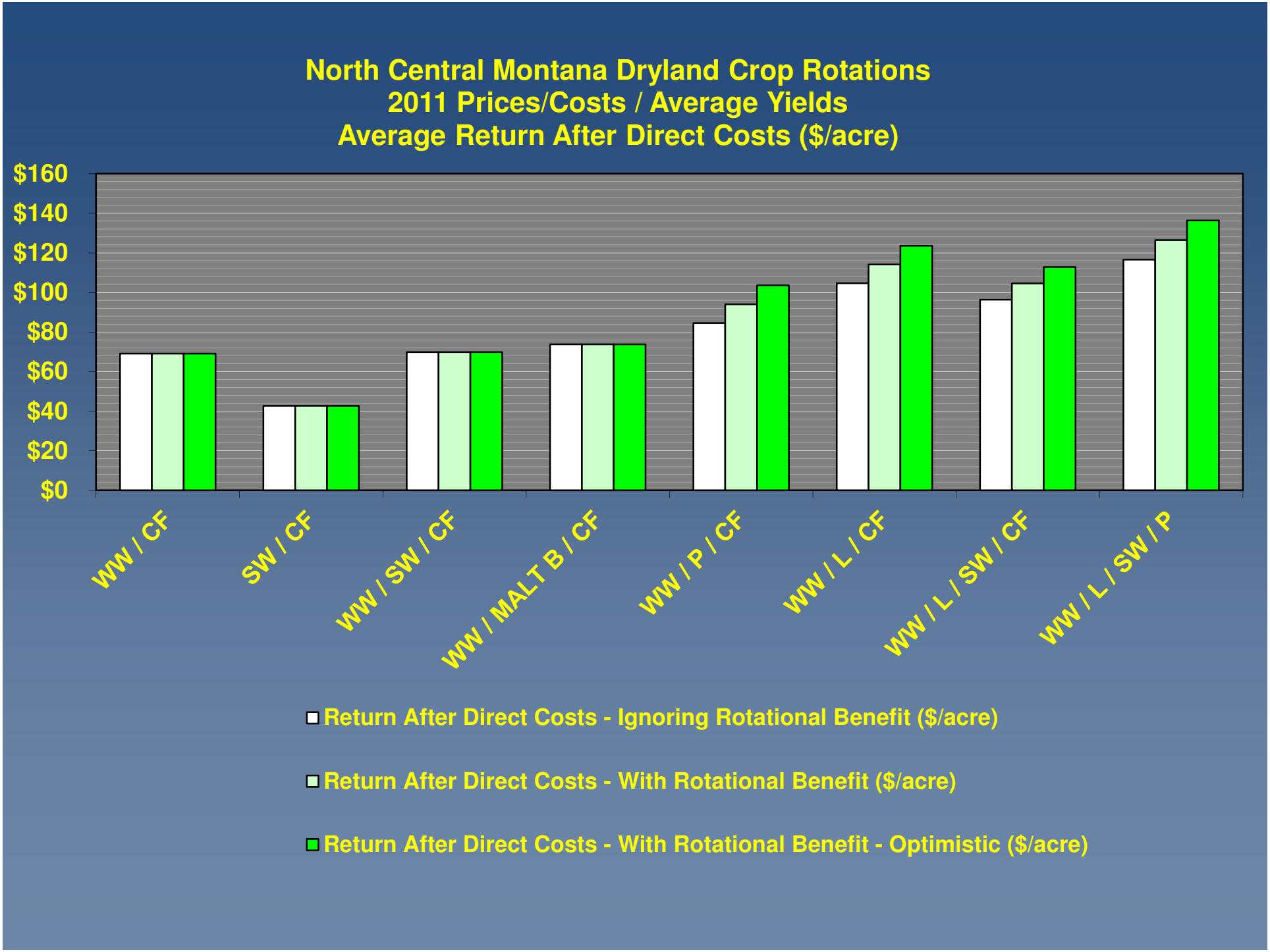


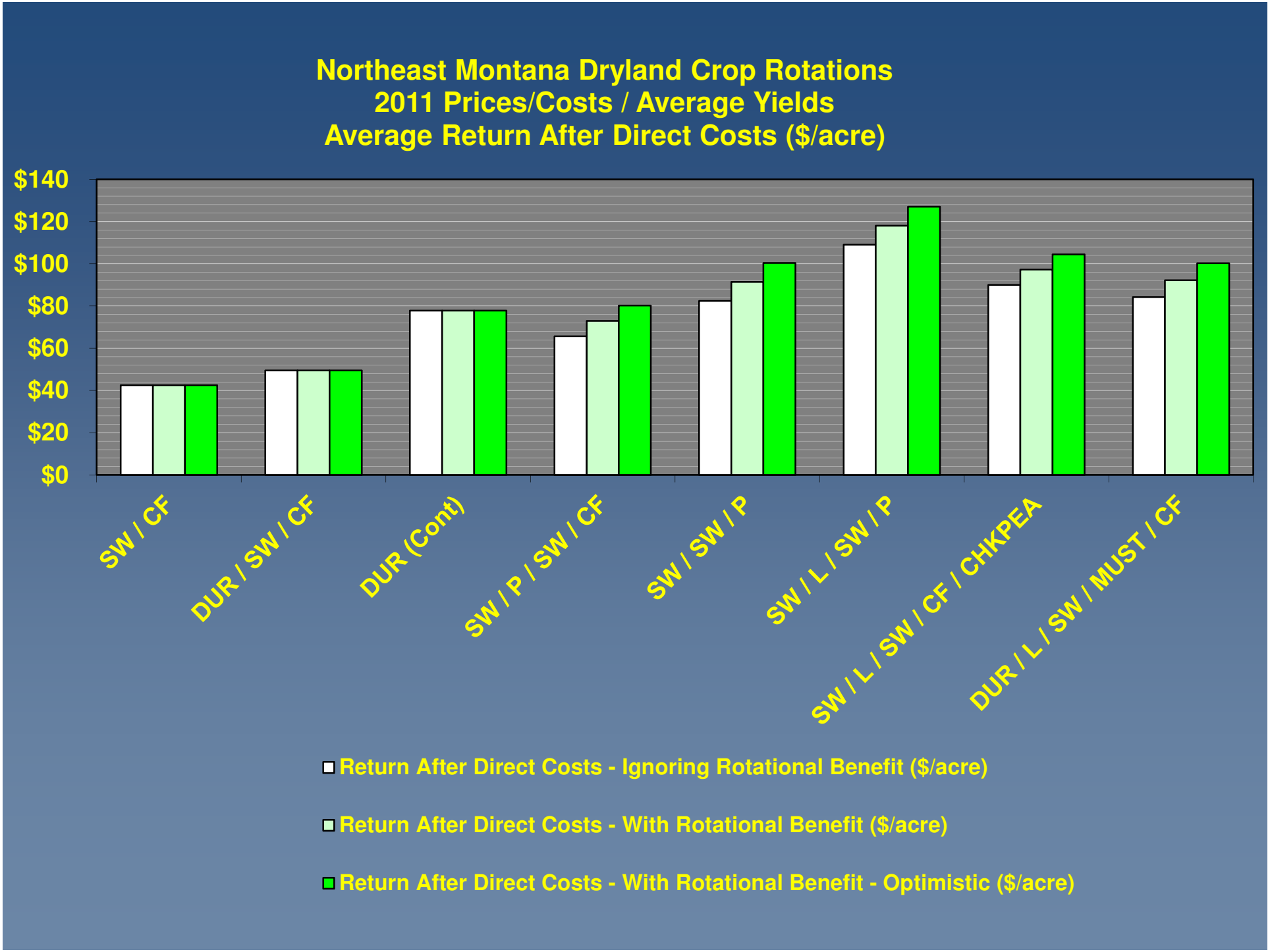
PULSE CROP ECONOMICS

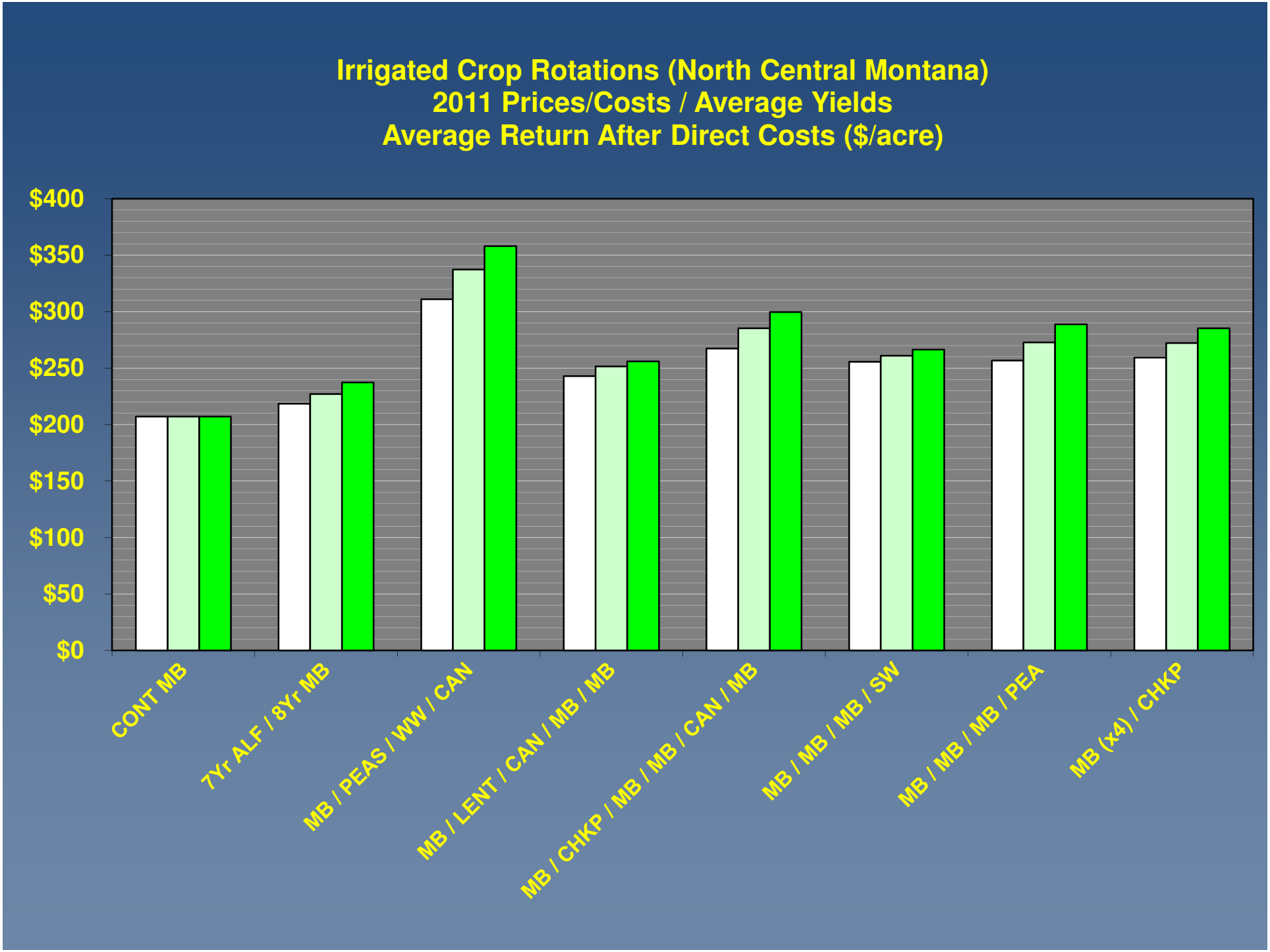
Estimated average returns of rotations did not incorporate rotational benefits:

- **Yield Enhancement**
- **Quality Improvement**

WHAT IF THEY DID?


North Central Montana Dryland Crop Rotations
2011 Prices/Costs / Average Yields
Average Return After Direct Costs ($/acre)
$160
$140
$120
$100
$80
$60
$40
$20
$0
WW / CF
SW / CF
WW / SW / CF
WW / MALT B / CF
WW / P / CF
WW / L / CF
WW / L / SW / CF
WW / L / SW / P
Return After Direct Costs - Ignoring Rotational Benefit ($/acre)
Return After Direct Costs - With Rotational Benefit ($/acre)
Return After Direct Costs - With Rotational Benefit - Optimistic ($/acre)


Northeast Montana Dryland Crop Rotations
2011 Prices/Costs / Average Yields
Average Return After Direct Costs ($/acre)
$140
$120
$100
$80
$60
$40
$20
$0
SW / CF
DUR / SW / CF
DUR (Cont)
SW / P / SW / CF
SW / SW / P
SW / L / SW / P
SW / L / SW / CF / CHKPEA
DUR / L / SW / MUST / CF
Return After Direct Costs - Ignoring Rotational Benefit ($/acre)
Return After Direct Costs - With Rotational Benefit ($/acre)
Return After Direct Costs - With Rotational Benefit - Optimistic ($/acre)


Irrigated Crop Rotations (North Central Montana)
2011 Prices/Costs / Average Yields
Average Return After Direct Costs ($/acre)
$400
$350
$300
$250
$200
$150
$100
$50
$0
CONT MB
7Yr ALF / 8Yr MB
MB / PEAS / WW / CAN
MB / LENT / CAN / MB / MB
MB / CHKP / MB / MB / CAN / MB
MB / MB / MB / SW
MB / MB / MB / PEA
MB (x4) / CHKP

PULSE CROP ECONOMICS

GLOBAL PERSPECTIVE:

India: largest producer, consumer, importer of pulse crops

- **Production: Over 50 million acres of pulse crops**
  - about 3.7 million acres of lentils
  - 63% of pulses grown in the winter season

- **Consumption: should be 22 million metric tons (to meet dietary recommendations)**
  - Production from two harvests is about 16 million metric tons
  - Gap (recommended consumption vs production) has doubled every decade in the last 30 years
  - In the last 10 years, the gap has averaged 5.3 million metric tons/yr

- **Imports: Normally imports about 3 million metric tons**

PULSE CROP ECONOMICS

GLOBAL PERSPECTIVE:

Major Producers:

- India
- Canada
- Turkey
- United States
- Australia
- Ukraine
- France
- China
- Germany
- Russia
- Pakistan

PULSE CROP ECONOMICS

GLOBAL PERSPECTIVE:

Major Exporters:

- Canada
- Turkey
- Australia
- United States
- Ukraine
- France

PULSE CROP ECONOMICS

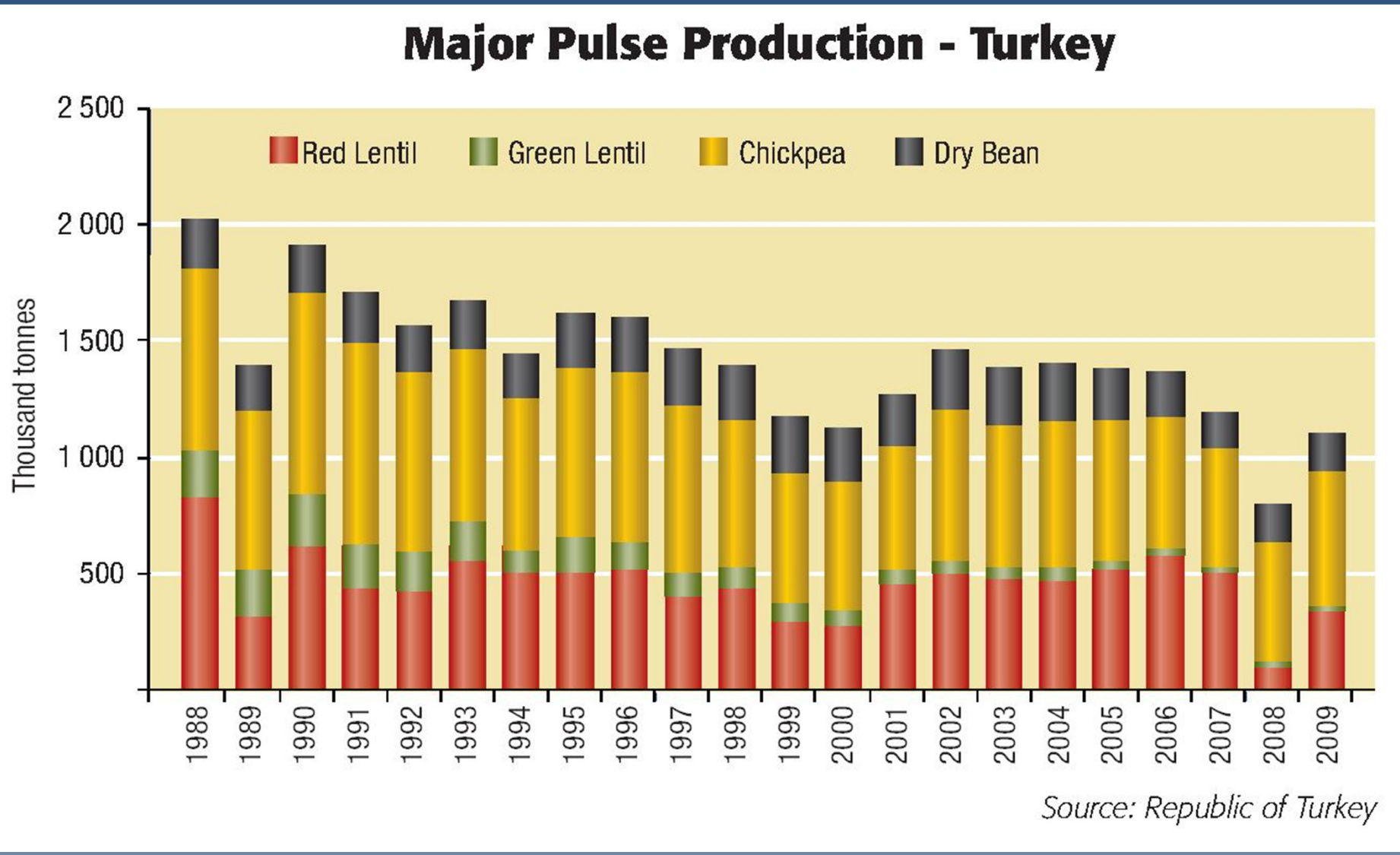
GLOBAL PERSPECTIVE:

Major Importers:

- India
- Bangladesh
- China
- Pakistan
- Sri Lanka
- North Africa Countries: Egypt, Algeria, Morocco
- Columbia
- Peru
- Mexico
- Spain and other European Countries
- Turkey (at times)

PULSE CROP ECONOMICS

TURKEY PULSE PRODUCTION (2009 Estimate & 2010 Forecast)



PULSE CROP ECONOMICS

GLOBAL PULSE CALENDAR:

May – June: Turkish Harvest

June – Sept: Indian Monsoon Rains

Late July – Mid September: U.S. / Canada Harvest

October: Indian Kharif Crop Harvest

- mostly beans: pigeon peas, mung beans, urd beans, and other crops - any shortfalls in these results in substitution

November / December : Australian Crop Harvest

Late February - Early April: Indian Rabi Crop Harvest

Lent: South American / Latin America Increased in Pulse Consumption

PULSE CROP ECONOMICS

HOW IS 2011 SHAPING UP?

- 2010 Indian Kharif Harvest – normal to good
- 2010 Australian Harvest – a promising crop encountered lots of moisture
- 2011 Indian Rabi Harvest – lower production despite more acres
- 2011 Turkish Crop – likely drop in production (competition for acres, dry)
- Large Canadian inventory of red lentils (low inventory of green lentils)
- Large Canadian inventory of peas is disappearing
- Canada likely to reduce lentil acreage by 20% (700,000 acres)
- North Dakota likely to see a drop in lentil acres
- Montana soil moisture situation is good
- Pulse prices probably will stay strong
- Favorable multiperil crop insurance insured prices

2011 seems to present an opportunity for Montana farmers to replace fallow acres with pulse crops , with moderate risk to 2012 soil moisture storage

PULSE CROP ECONOMICS

TRENDS DRIVING PULSE MARKETS

More Demand Driven than Supply Driven

From NDSU Pulse Crop Marketing Guide (2006):

- **Population Growth – demand for protein / vegetable protein**
- **Globalization – trade + changes in land use elsewhere**
- **Weather Patterns**
- **Health Conscious Affluent Markets**

Other:

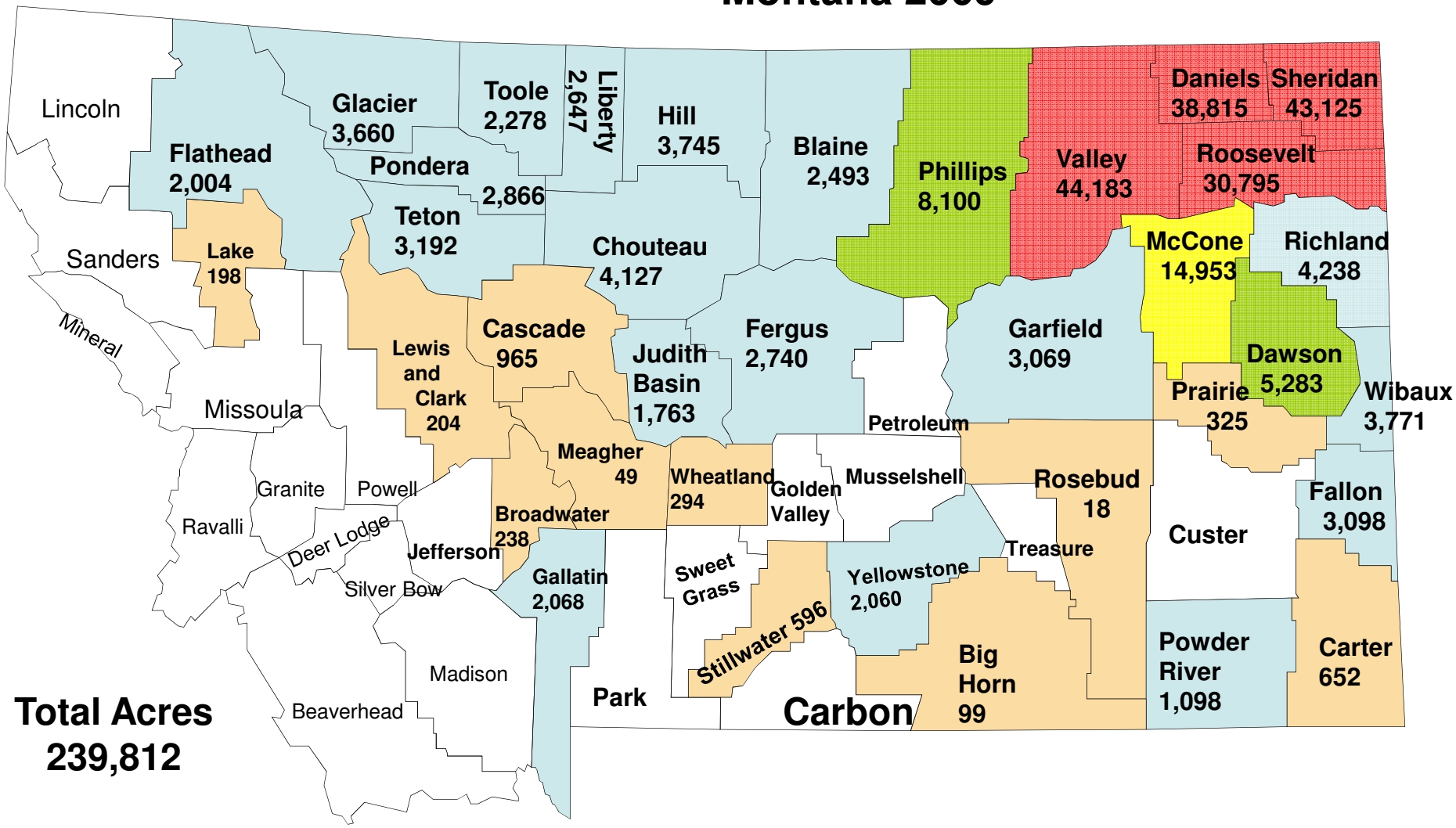
- **Increased global meat consumption driving commodity markets**
- **Currency Exchange Rates**
  - **Stronger Canadian Dollar makes US exports more competitive**

PULSE CROP ECONOMICS

MONTANA'S GROWING PULSE INDUSTRY

Compiled by: Chet Hill,
NDSU Extension Service

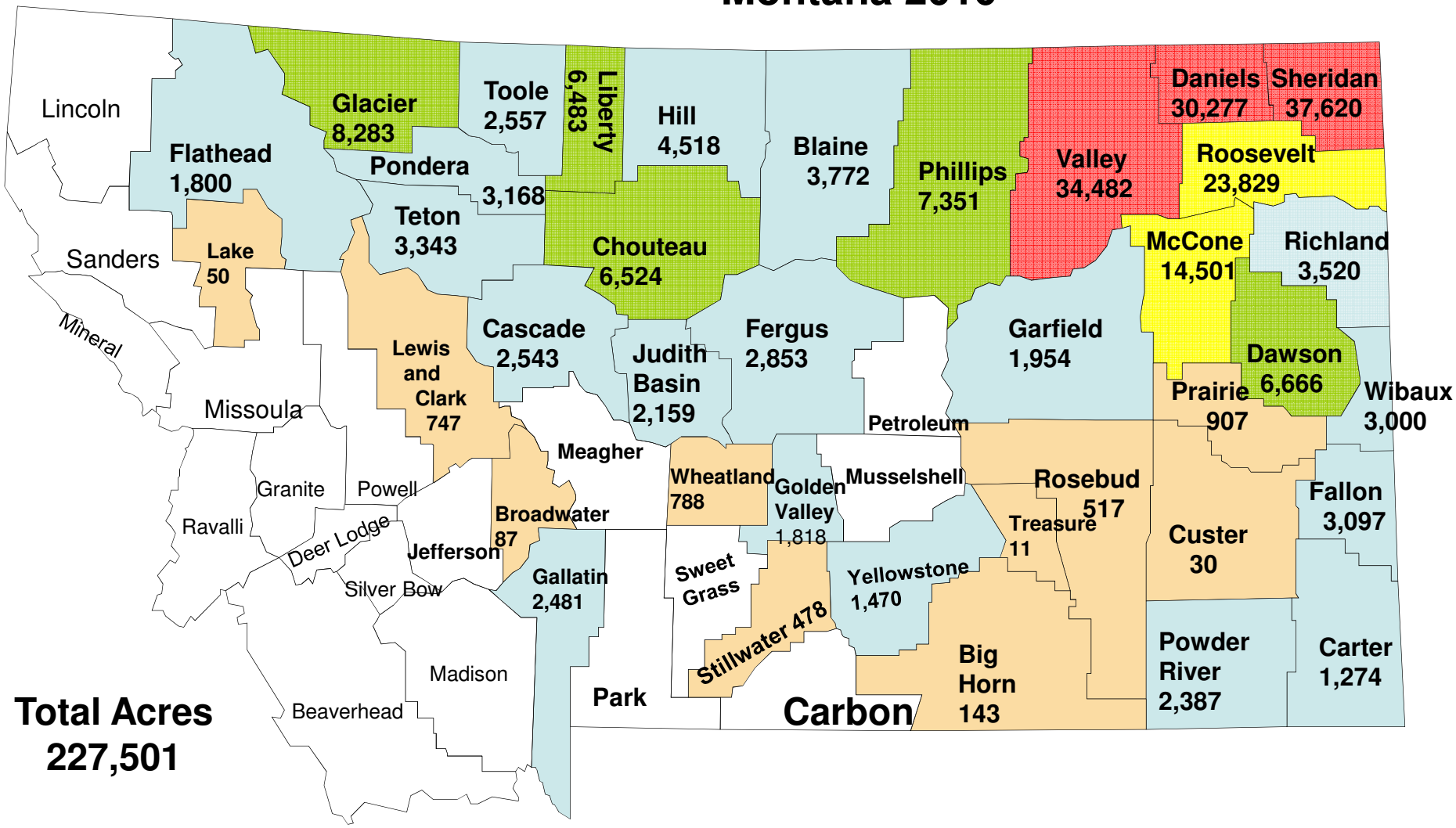
Field Pea Planted Acres
Montana 2009



Source: MT FSA

Compiled by: Chet Hill,
NDSU Extension Service

Field Pea Planted Acres
Montana 2010



Total Acres
227,501

1 – 1,000 acres

1,001 – 5,000 acres

5,001 – 10,000 acres

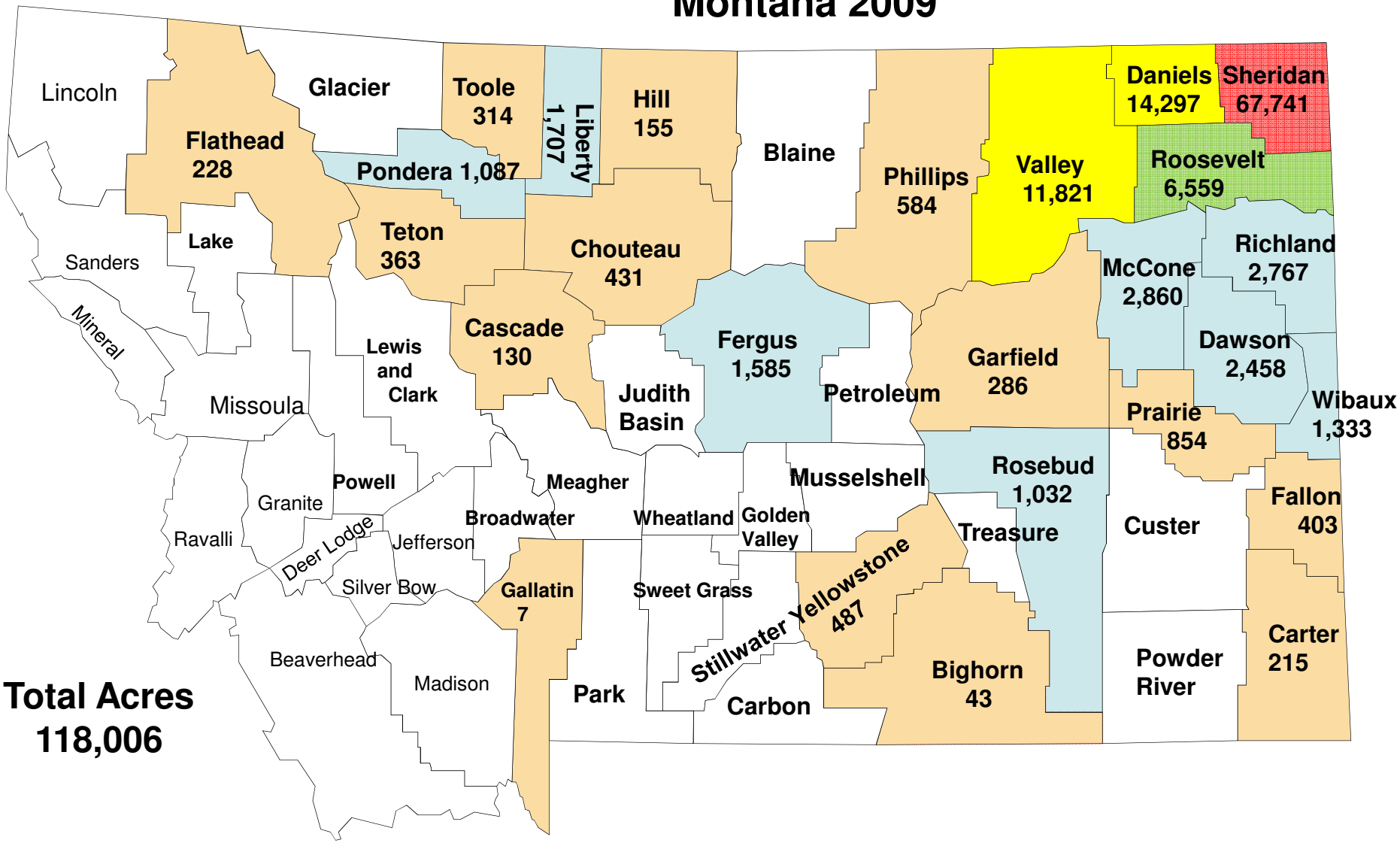
10,001 – 30,000 acres

30,000+ acres

Source: MT FSA

Compiled by: Chet Hill,
NDSU Extension Service

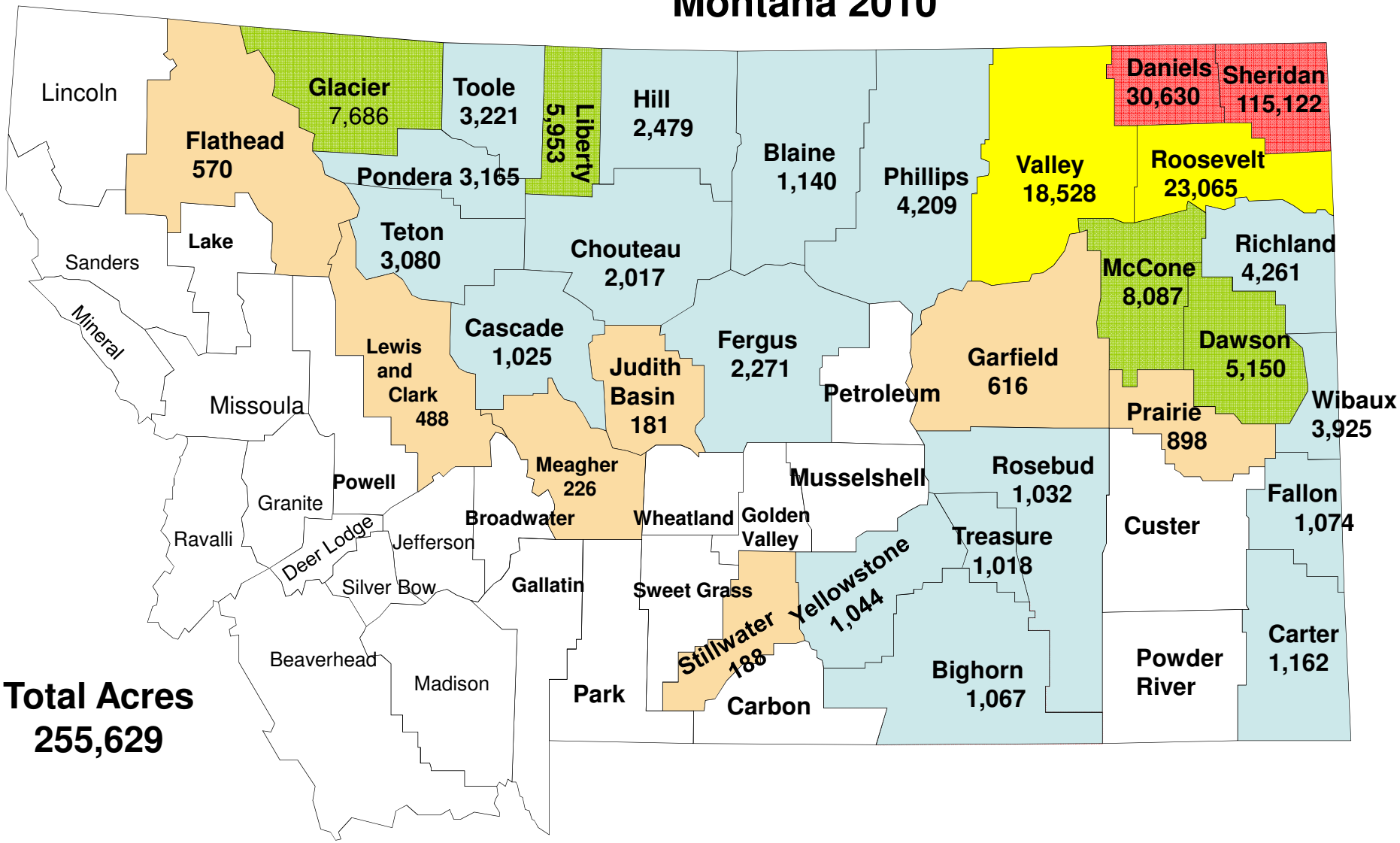
Lentils Planted Acres
Montana 2009



Source: MT FSA

Compiled by: Chet Hill,
NDSU Extension Service

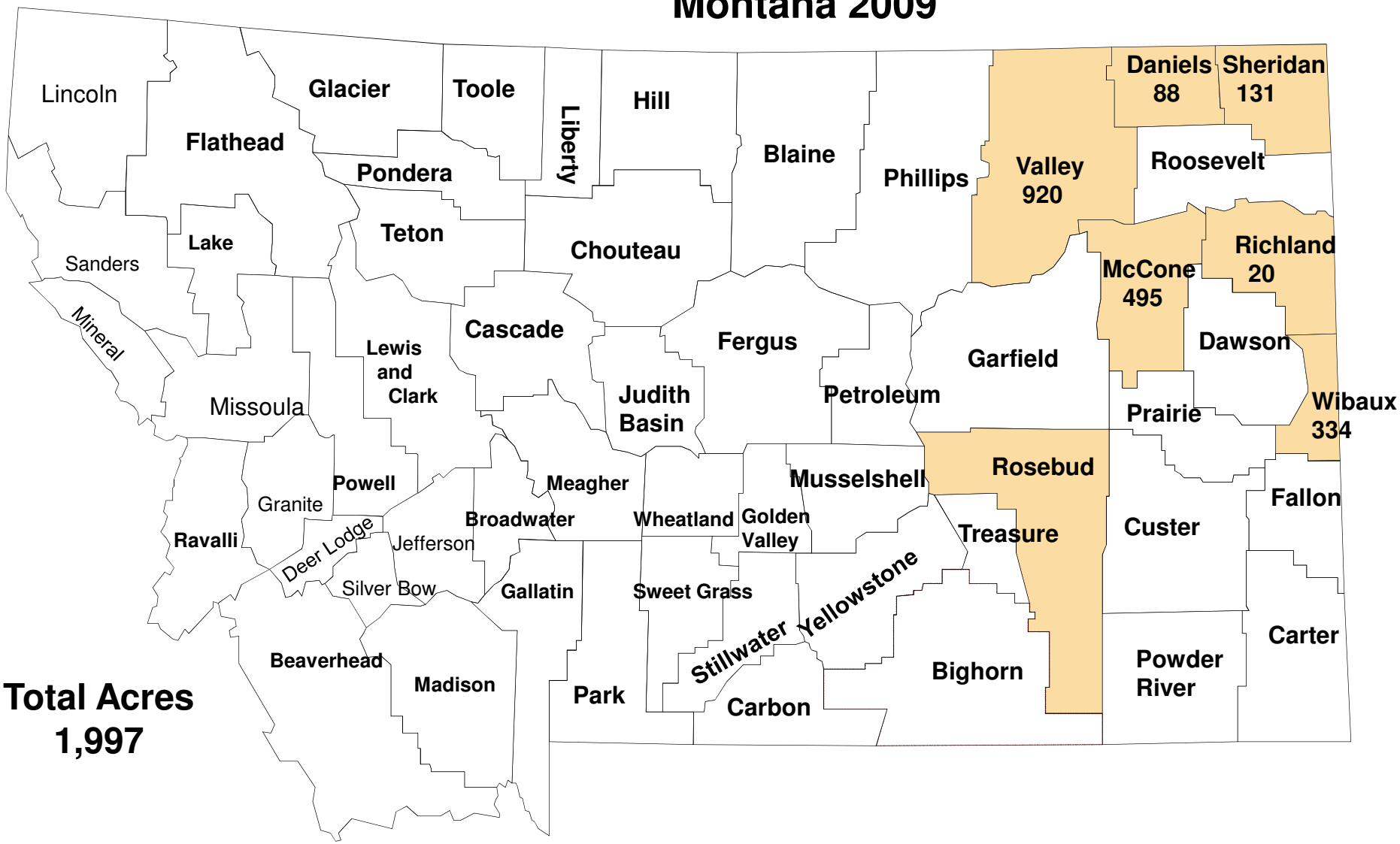
Lentils Planted Acres
Montana 2010



Source: MT FSA

Compiled by: Chet Hill,
NDSU Extension Service

Chickpeas Planted Acres
Montana 2009



Total Acres
1,997

1 – 1,000 acres

1,001 – 5,000 acres

5,001 – 10,000 acres

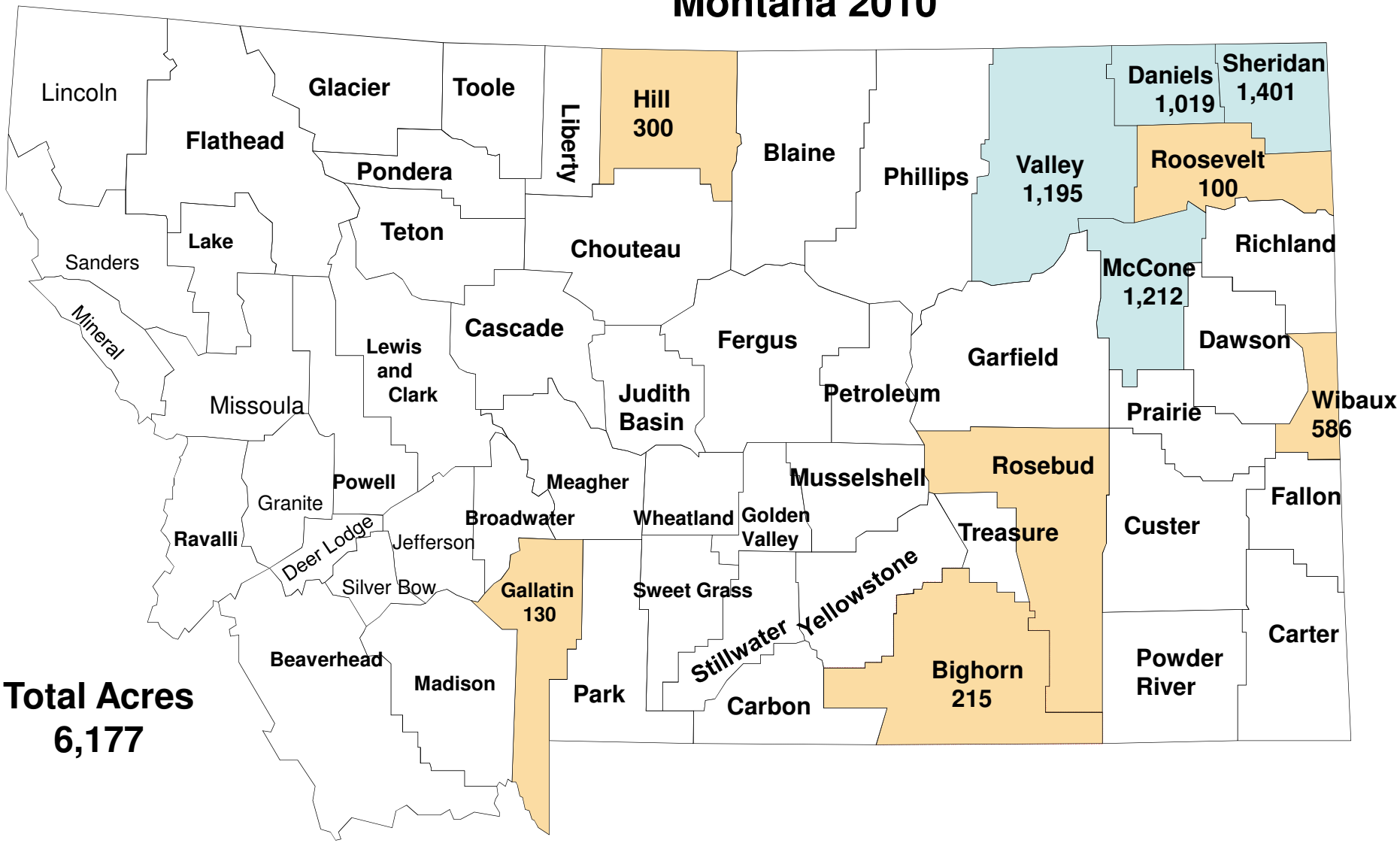
10,001 – 30,000 acres

30,000+ acres

Source: MT FSA

Compiled by: Chet Hill,
NDSU Extension Service

Chickpeas Planted Acres
Montana 2010



Total Acres
6,177

1 – 1,000 acres

1,001 – 5,000 acres

5,001 – 10,000 acres

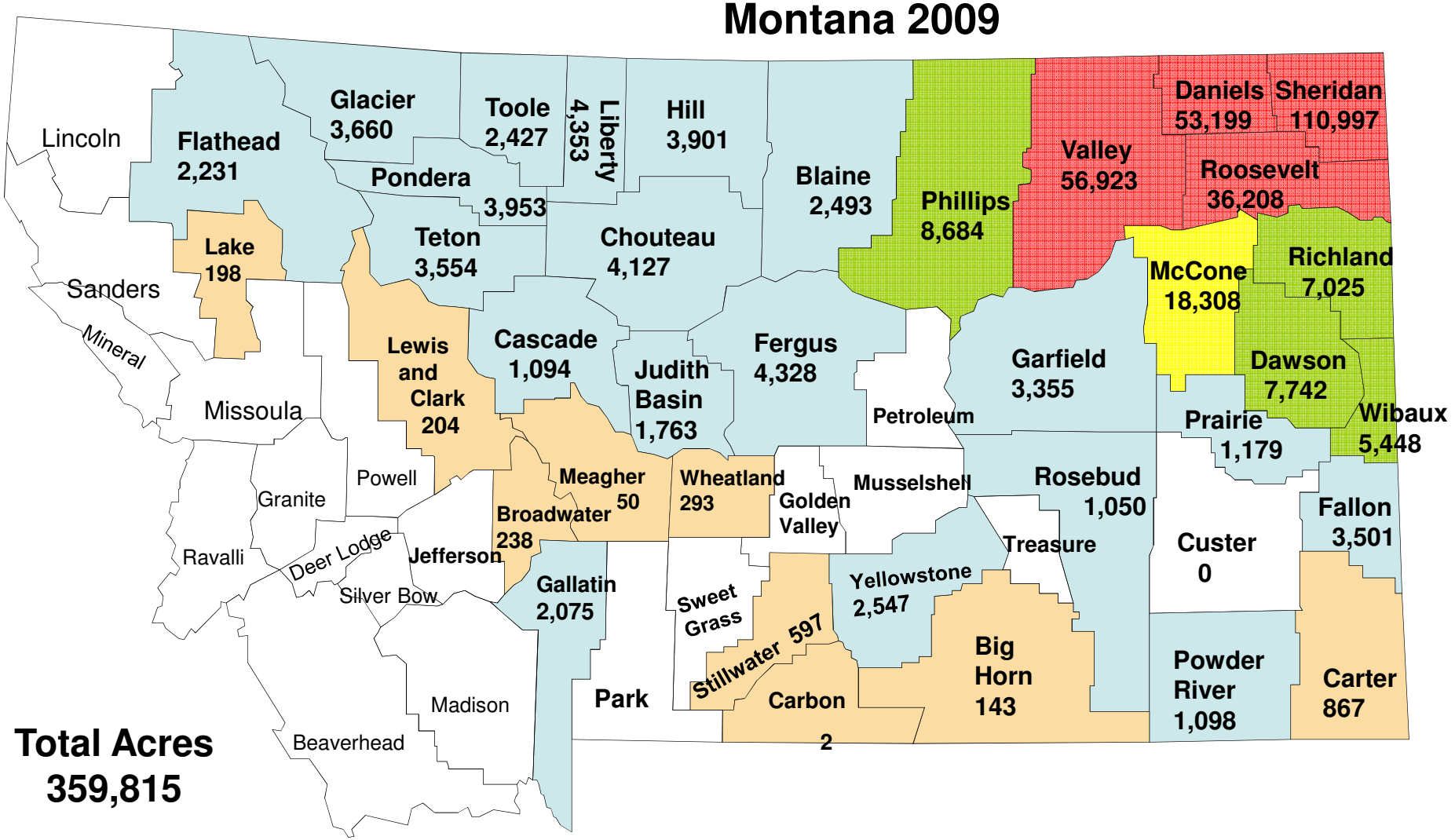
10,001 – 30,000 acres

30,000+ acres

Source: MT FSA

Compiled by: Chet Hill,
NDSU Extension Service

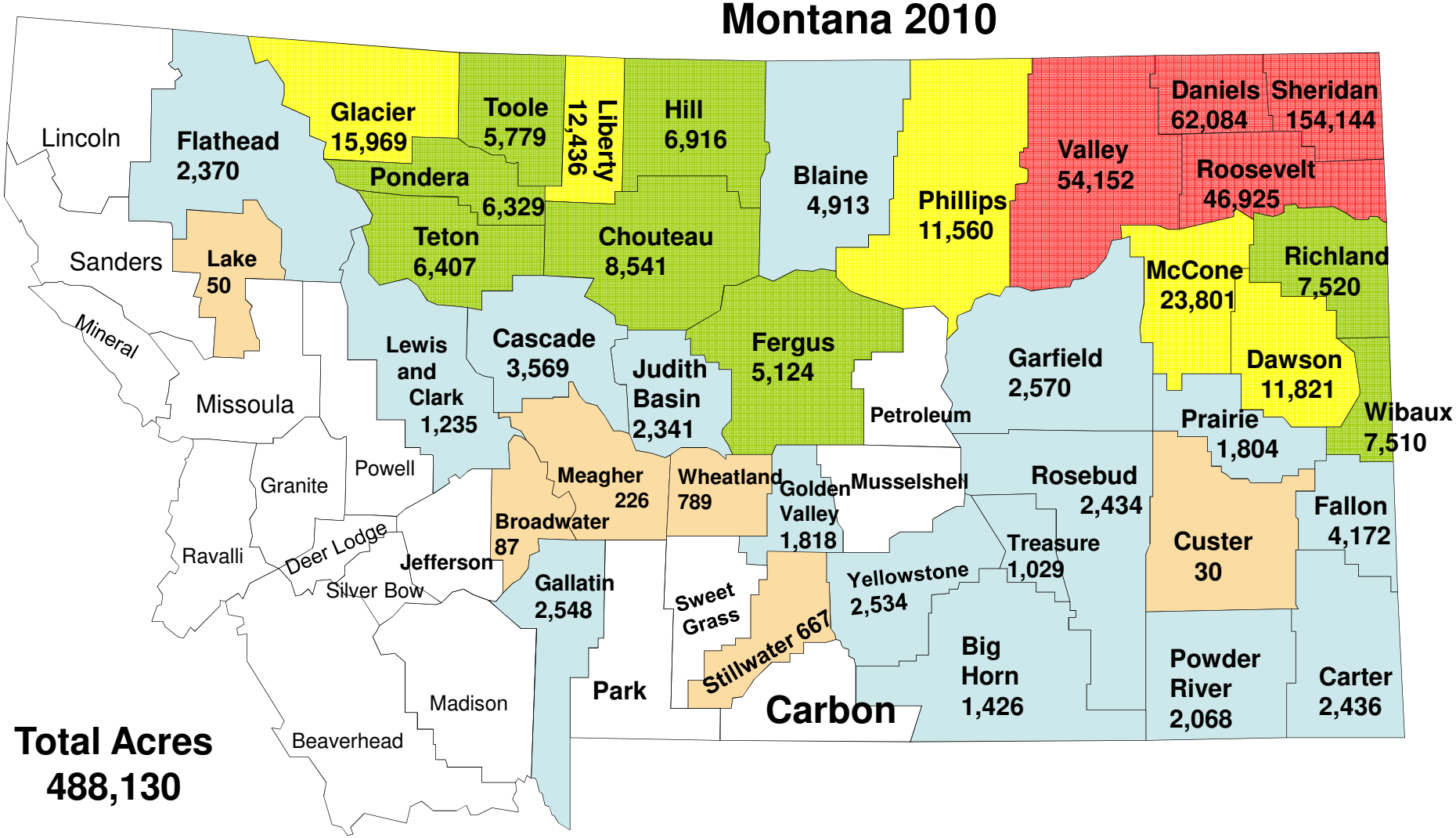
Pulse Crop Planted Acres
Montana 2009



Source: MT FSA

Compiled by: Chet Hill,
NDSU Extension Service

Pulse Crop Planted Acres
Montana 2010



Total Acres
488,130

1 – 1,000 acres

1,001 – 5,000 acres

5,001 – 10,000 acres

10,001 – 30,000 acres

30,000+ acres

Source: MT FSA

DISCLAIMER

The economic returns presented are estimates, not fact.

Make estimates that are applicable to your:

- **farm,**
- **yield history,**
- **growing conditions, and**
- **your perception of risk.**

Be cautious about planting if herbicide residual is a risk

Consider your potential harvesting capacity when deciding how many acres to plant

To Discuss More, Contact:

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MONTANA Department of AGRICULTURE